OWNER'S MANUAL

HV™100THD

HIGH VOLTAGE HYBRID TUBE AMPLIFIER HEAD

Congratulations on the purchase of your new Kustom® High Voltage HV™ Series guitar amplifier head. This model utilizes an exclusive preamp design that combines a 12AX7 tube, known for its robust tonal qualities, with solid-state circuitry that provides consistency of performance and reliability. The result is rich, dynamic tone that is perfect for a wide variety of playing styles and environments. Inside this manual you'll find details about your HV Series model. Everyone at Kustom wishes you many years of enjoyment with your new amplifier head!

kustom.com

FCC STATEMENTS

1. Caution: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

2. Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

ENGLISH

Danger

Exposure to extremely high noise levels may cause a permanent hearing loss. Individuals vary considerably to noise induced hearing loss but nearly everyone will lose some hearing if exposed to sufficiently intense noise for a sufficient time.

The U.S. Government's Occupational Safety and Health Administration (OSHA) has specified the following permissible noise level exposures:

DURATION PER DAY (HOURS)	8	6	4	3	2	1
SOUND LEVEL (dB)	90	93	95	97	100	103

According to OSHA, any exposure in the above permissible limits could result in some hearing loss. Ear plugs or protectors in the ear canal or over the ears must be worn when operating this amplification system in order to prevent a permanent hearing loss. If exposure in excess of the limits as put forth above, to insure against potentially harmful exposure to high sound pressure levels, it is recommended that all persons exposed to equipment capable of inducing high sound pressure levels, such as this amplification system, be protected by hearing protectors while this unit is in operation.

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: *TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE CHASSIS. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.*

AVIS: RISQUE DE CHOC ELECTRIQUE-NE PAS OUVRIR.

THIS SYMBOL IS INTENDED TO ALERT THE USER TO THE PRESENCE OF NON-INSULATED "DANGEROUS VOLTAGE" WITHIN THE PRODUCT'S ENCLOSURE THAT MAY BE OF SUFFICIENT MAGNITUDE TO CONSTITUTE A RISK OF ELECTRIC SHOCK TO PERSONS.

THIS SYMBOL IS INTENDED TO ALERT THE USER TO THE PRESENCE OF IMPORTANT OPERATING AND MAINTENANCE (SERVICING) INSTRUCTIONS IN THE LITERATURE ACCOMPANYING THE UNIT.

APPARATUS SHALL NOT BE EXPOSED TO DRIPPING OR SPLASHING AND THAT NO OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, SHALL BE PLACED ON THE APPARATUS.

IMPORTANT SAFETY INSTRUCTIONS

1. Read all safety and operating instructions before using this product.
2. All safety and operating instructions should be kept for future reference.
3. Read and understand all warnings listed on the operating instructions.
4. Follow all operating instructions to operate this product.
5. This product should not be used near water, i.e. Bathtub, sink,swimming pool, wet basement, etc.
6. Only use dry cloth to clean this product.
7. Do not block any ventilation openings, It should not be placed flat against a wall or placed in a built-in enclosure that will impede the flow of cooling air.
8. Do not install this product near any heat sources ;such as,radiators, heat registers, stove or other apparatus (including heat producing amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the 0ther.A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord being walked on or pinched, particularly at Plugs, convenience receptacles and the point where they exit from the apparatus. Do not break the ground pin of the power supply cord.
11. Only use attachments specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer or sold with the apparatus. When a cart is used, use caution when moving cart/ apparatus combination to avoid injury from tip-over.

13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Care should be taken so that objects do not fall and liquids are not spilled into the unit through the ventilation ports or any other openings.
15. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way; such as, power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally or has been dropped.
16. WARNING: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
17. The MAINS plug or an appliance coupler is used as the disconnect device, the disconnect device shall remain readily operable.

FRENCH

Danger

L'exposition a des niveaux eleves de bruit peut provoquer une perte permanente de l'audition, Chaque organisme humain reagit differemment quant a la perte de l'audition, mais quasiment tout le monde subit une diminution de l'acuite auditive lors d'une exposition suffisamment longue au bruit intense. Les autorites competentes en reglementation de bruit ont defini les expositions tolerees aux niveaux de bruits:

DURE EN HEURES PAR JOUR	8	6	4	3	2	1
INIVEAU SONORE CONTINU EN dB	90	93	95	97	100	103

Selon les autorites, toute exposition dans les limites citees ci-dessus,peuvent provoquer certaines pertes d'audition. Des bouchons ou protections dans l'appareil auditif ou sur l'oreille doivent etre portes lors de l'utilisation de ce systeme d'amplification afin de prevenir le risque de perte permanente de l'audition, Dans le cas d'expositions superieures aux limites precitees il est recommande, afin de se premunir contre les expositions aux pressions acoustiques elevees potentiellement dangereuses, aux personnes exposees aux equipements capables de delivrer de telles puissances, tels ce systeme d'amplification en fonctionnement, de proteger l'appareil auditif.

ATTENTION

RISQUE DE CHOC ELECTRIQUE NE PAS OUVRIR.

ATTENTION: AFIN DE LIMITER LE RISQUE DE CHOC ELECTRIQUE, NE PAS ENLEVER LE CHASSIS. NE CONTIENT PAS DE PIECES POUVANT ETRE REPAREE PAR L'UTILISATEUR. CONFIER LE SERVICE APRES-VENTE AUX REPARATEURS AGREES.

CE SYMBOLE A POUR BUT D'AVERTIR L'UTILISATEUR DE LA PRESENCE DE VOLTAGE DANGEREUX NON-ISOLE A L'INTERIEUR DE CE PRODUIT QUI PEUT ETRE DE PUISSANCE SUFFISAMMENT IMPORTANTE POUR PROVOQUER UN CHOC ELECTRIQUE AUX PERSONNES.

CE SYMBOLE A POUR BUT D'AVERTIR L'UTILISATEUR DE LA PRESENCE D'INSTRUCTIONS D'UTILISATION ET DE MAINTENANCE DANS LES DOCUMENTS FOURNIS AVEC CE PRODUIT.

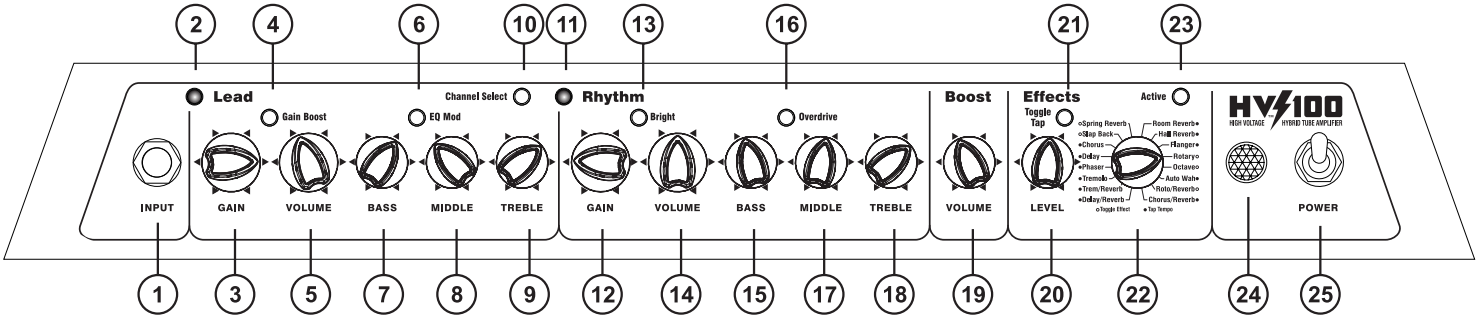
AFIN DE REDUIRE LES RISQUÉ D'INCENDIE ET DE DECHARGE ELECTRIQUE, NE PAS EXPOSER CET APPAREIL A LA PLUIE OU A L'HUMIDITE.

IMPORTANTES INSTRUCTIONS DE SECURITE

1. Lire avec attention toutes les recommandations et précautions d'emploi avant d'utiliser ce produit.
2. Toutes les recommandations et précautions d'emploi doivent être conservées afin de pouvoir s'y reporter si nécessaire.
3. Lire et comprendre tous les avertissements énumérés dans les précautions d'emploi.
4. Suivre toutes les précautions d'emploi pour utiliser ce produit.
5. Ce produit ne doit pas être utilisé près d'eau, comme par exemple baignoires, éviers, piscine, sous-sol humides ... Etc.
6. Utiliser exclusivement un chiffon sec pour nettoyer ce produit.
7. Ne bloquér aucune ouverture de ventilation. Ne pas placer le produit tout contre un mur ou dans une enceinte fernée, cela gênerait le flux d'air nécessaire au refroidissement.
8. Ne pas placer le produit près de toute source de chaeur telle que radiateurs, arrivées d'air chaud, fourneaux ou autres appareils générant de la chaleur (incluant les amplificateurs producteurs de chaleur) .
9. Ne pas négliger la sécurité que procure un branchement polarisé ou avec raccordement à la terre, Un branchement polarisé comprend deux fiches dont l'une est plus large que l'autre. Un branchement à la terre comprend deux fiches plus une troisième reliée à la terre. Si la fiche secteur fournie ne s'insert pas dans votre prise de courant. consulter un 'électricien afin de remplacer votre prise obsolète.
10. Protéger le cordon d'alimentation de tout écrasement ou pincement, particulièrement au niveau des fiches, des réceptacles utilisés et à l'endroit de sortie de l'appareil. Ne pas casser la fiche de terre du cordon d'alimentation.
11. Utiliser uniquement les accessoires spécifiés par le constructeur.
12. Utiliser uniquement avec le chariot de transport, le support, le trépied, la console ou la table spécifiés par le constructeur ou vendus avec l'appareil. Lors de l'utilisation d'un chariot, bouger avec précaution l'ensemble chariotlappareil afin d'éviter les dommages d'un renversement.

13. Débrancher cet appareil lors d'orages ou s'il n'est pas utilisé pendant une longue période.
14. Des précautions doivent être prises afin qu'aucun objet ne tombe et qu'aucun liquide ne se répande à l'intérieur de l'appareil par les orifics de ventilation ou n'importe quelle autre ouverture.
15. Pour toutes interventions techniques s'adresser à un technicien qualifié.L'intervention technique est nécessaire lorsque l'appareil a été endommagé de n'importe quelle façon, comme par exemple si le cordon secteur ou sa fiche sont détériorés,si du liquide a coulé ou si des objets sont tombés à l'intérieur de l'apparei1,si l'appareil a été exposé à la pluie ou à l'humidité, s'il ne fonctionne pas normalement ou s'il est tombé.
16. ATTENTI0N:Pour réduire le risque d'incendie ou de choc electrique ne pas exposer l'appareil à la pluie ou à l'humidité.
17. La prise Mains, au coupler, est utilisé pour la source d'alimentation électrique. Il est conseillê de garder cette prise facilement accessible.

HV™ 100THD CONTROL PANEL FUNCTIONS



1.) Input - this is a 1/4-inch, 2-conductor input jack for plugging in your instrument. It is intended for guitars but will accept other instruments as well.

2.) Lead Channel LED - when this LED light is on, it indicates that the Lead Channel is active.

3.) Lead Gain - adjust this clockwise to increase the amount of distortion. Lower ranges of this control produce a less distorted sound. As you increase the gain, you add distortion to the signal.

4.) Gain Boost - this switch will add more gain to the Lead Channel.

5.) Lead Volume - this is a volume control for the Lead Channel ONLY.

6.) EQ Mod - this switch selects between two preamp tonalities, each offers a different tonal variation.

7.) Lead Bass - this passive EQ adjusts the low frequency equalization of the amplifier. For tighter low-end response, set the Bass control to lower settings. This is particularly helpful when using the amp at very loud volume levels.

8.) Lead Middle - this passive EQ adjusts the midrange equalization of the amplifier. It interacts with the Bass and Treble EQ as described in the Treble EQ section below. For a heavier, more distorted sound, set the Middle lower. For a vintage-style, cleaner sound, set the Middle higher.

9.) Lead Treble - this passive EQ adjusts the high frequency equalization of the amplifier, but also interacts with the Bass and Middle controls as follows: As Treble is increased, Bass automatically decreases and the Middle slides down in frequency. Conversely, if Treble is decreased, Bass automatically increases and the Middle slides up in frequency. This interaction is typical of classic, passive tone controls and is responsible for the increased effectiveness of such a simple system.

10.) Channel Select - this switch selects between the Lead or Rhythm Channel.

11.) Rhythm Channel LED - when this LED light is on, it indicates that the Rhythm Channel is active.

12.) Rhythm Gain - adjust this clockwise to increase the amount of gain in the Rhythm Channel. The gain is applied before the tone controls.

13.) Bright - this enhances upper Treble frequencies and helps provide clarity to darker sounding guitars.

14.) Rhythm Volume - this is a volume control for the Rhythm Channel only.

15.) Rhythm Bass - this passive EQ adjusts the low frequency equalization of the amplifier. For tighter low-end response, set the Bass control to lower settings. This is particularly helpful when using the amp at very loud volume levels.

16.) Overdrive - this increases the gain of the second stage of the 12AX7 preamp tube on the Rhythm Channel.

17.) Rhythm Middle - this passive EQ adjusts the midrange equalization of the amplifier. It interacts with the Bass and Treble EQ as described in the Treble EQ section below. For a heavier, more distorted sound, set the Middle lower. For more of a vintage-style, cleaner sound, set the Middle higher.

18.) Rhythm Treble - this passive EQ adjusts the high frequency equalization of the amplifier, but also interacts with the Bass and Middle controls as follows: As Treble is increased, Bass automatically decreases and the Middle slides down in frequency. Conversely, if Treble is decreased, Bass automatically increases and the Middle slides up in frequency. This interaction is typical of classic, passive tone controls and is responsible for the increased effectiveness of such a simple system.

19.) Boost - this is a volume control for the overall amplifier that can be used to boost the volume of solos. The optional HV footswitch can be used to activate this boost.

20.) Effects Level - this control adds the effects section and mixes it into the main signal. Sixteen different effects are available.

21.) Toggle Tap - this momentary switch performs different functions, depending on which effect is selected. **Page 6** describes each effect in detail and how to enhance its usefulness with this switch.

22.) Effects Program Select - this switch will select any of sixteen different effects. **Page 6** describes each effect in detail.

23.) Effects Active - this switch engages the effects section. The footswitch over-rides this switch when it's plugged into the amp.

24.) Jewel Light - this jewel light lets you know that the amplifier is on.

25.) Power Switch - this switch turns on and off the AC power to the amp.

HV™ 100THD EFFECTS

Effects Level - this control adds the effects section and mixes it into the main signal. Sixteen different effects are available.

Effects Program Select - this switch will select any of the sixteen different effects.

Effects Active - this switch engages the effects section. The footswitch over-rides this switch when it's plugged into the amp.

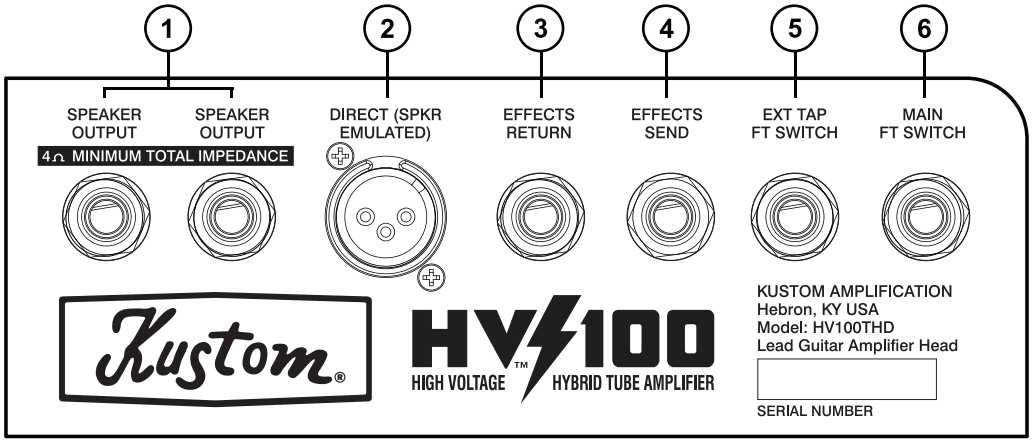
Toggle Tap - this switch is a dual function depending on which effect is selected. On "Toggle" effects, this button cycles through alternate variations of the effect. For example, for the Spring Reverb, it cycles through 3 different degrees of brightness. On "Tap" effects, this button selects the rate time at which the effect cycles, by tapping the switch twice. For example, for the Delay setting, it selects the amount of time between delay repeats (If the 2nd tap is beyond the maximum setting, the time will default to the longest available choice).

Effects	Description	Toggle	Tap	Toggle Tap Function
Spring Reverb	Simulates the spring reverb found in vintage tube amps	X		Pages through 3 different degrees of reverb brightness
Room Reverb	The sound of your amp being played in a room		X	Adjusts Reverb decay time
Hall Reverb	The sound of your amp being played in a large hall		X	Adjusts Reverb decay time
Flanger	Deep flanger for spacey, sweeping tones		X	Adjusts Flanger rate time
Rotary	The swirling sound of vintage organ speaker cabinets	X		Ramps between fast and slow Rotary speeds
Octave	Shifts the pitch up or down one octave from the original signal	X		Toggles between Octave up and Octave down
Auto Wah	Wah Wah automatically sweeps at your chosen speed		X	Adjusts Auto Wah rate time
Roto/Reverb	Combination effect of Rotary with Room Reverb	X		Ramps between fast and slow Rotary speeds
Chorus/Reverb	Combination effect of Chorus and Room Reverb		X	Adjusts Chorus rate time
Delay/Reverb	Combination effect of the delay and room reverb		X	Adjusts Delay time…..maximum delay = 350 mS
Trem/Reverb	Combination effect of tremolo and room reverb		X	Adjusts Tremolo rate time
Tremolo	Classic-sounding tremolo with a hint of vibrato		X	Adjusts Tremolo rate time
Phaser	Swooshy '70s-style phase shifter		X	Adjusts Phaser rate time
Delay	Organic-sounding longer delays		X	Adjusts Delay time….maximum delay = 680 mS
Chorus	Thick chorus with enhanced harmonics		X	Adjusts Chorus rate time
Slap Back	Fast 80ms delay effect	X		Toggles between Slapback and Slapback/Reverb

Effects Module Memory - aside from all the versatility of the built-in effects, the effects module in your Kustom amplifier has the ability to store your favorite sounds. All the most recent changes to the Toggle Tap button are saved in each of the 16 effect locations. For example, if you tap in your favorite delay time, then go to chorus, and then go back to delay, your own tapped delay time will still be saved. These setting changes are also retained when powering down the amplifier.

To Restore Factory Settings - if you ever want to restore the effects to the factory default settings, you can do this by selecting Program 1 (Delay/Reverb), then holding the tap switch down and simultaneously selecting Program 2 (Trem/Reverb).

HV™ 100THD BACK PANEL FUNCTIONS



1.) Speaker Outputs - these are 2-conductor, paralled, 1/4-inch jacks that are provided to connect the HV100THD to external speaker cabinets. Rating is 4-ohms minimum. For full power, use a 4-ohm speaker load. Higher impedance loads will result in lower power levels to the speakers. The signal path to the internal speakers is disconnected when using this jack.

2.) Direct (SPKR Emulated) - this is a 3-conductor, XLR output jack for plugging into Lo-Z microphone inputs as found on PA or recording mixers. It is intended in place of external mics or used as a built-in direct box.

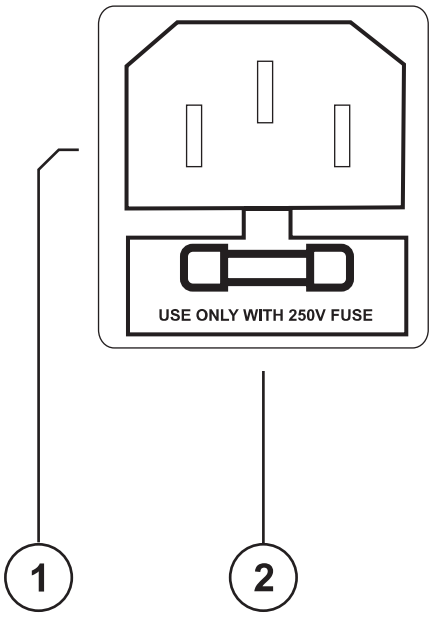
3.) Effects Return - this switching, 2-conductor, 1/4-inch line level input jack is the return from an external signal processor such as a digital delay or EQ. By using this jack, you break the signal path between the preamp output and power amp input.

4.) Effects Send - this 2-conductor, 1/4-inch line level output jack is the send to an external signal processor. It can also be used as a preamp output and it does not break the signal path between the power amp and preamp. The front panel volume and tone controls do affect the output of this jack. The output of the speaker is not emulated, so this is not a good choice as a substitute for mic-ing the amp.

5.) Ext Tap FT Switch - this 2-conductor, 1/4-inch switching jack replaces the Toggle Tap switch on the top panel. This is a nice feature to have, because it allows you to change the selected effect parameter in real time with your foot while playing. Using the jack disables the top panel switch. The jack accepts a non-LED single button momentary footswitch. This footswitch is not included with the amplifier. Kustom model KACFS-101M can be purchased separately. Most keyboard sustain pedals are this type and can also be used. (**NOTE:** most single button footswitches used on analog instrument amplifiers are alternate contact -- the “push on/push off” type. Using this type of switch will give unsatisfactory results but will not damage the amplifier.)

6.) Main FT Switch - this 1/4-inch stereo jack connects a footswitch to the amplifier. It uses a special circuit to decode the 3 switches through a simple stereo cable. The tip selects the rhythm or lead channel. The ring is multifunction for the overdrive on/off switch and the effects active/off switch. This footswitch is not included with the amplifier. Kustom model KACFS-301 must be used to enjoy all the features. In an emergency, a mono single-conductor shielded instrument cable and single button footswitch can be used to allow switching of the channels only. In this setup, the LEDs will not be visible, but at least the footswitch will select Rhythm or Lead channels. The top panel overdrive on/off and effects active/off switches will still function.

HV™ 100THD AC MAINS

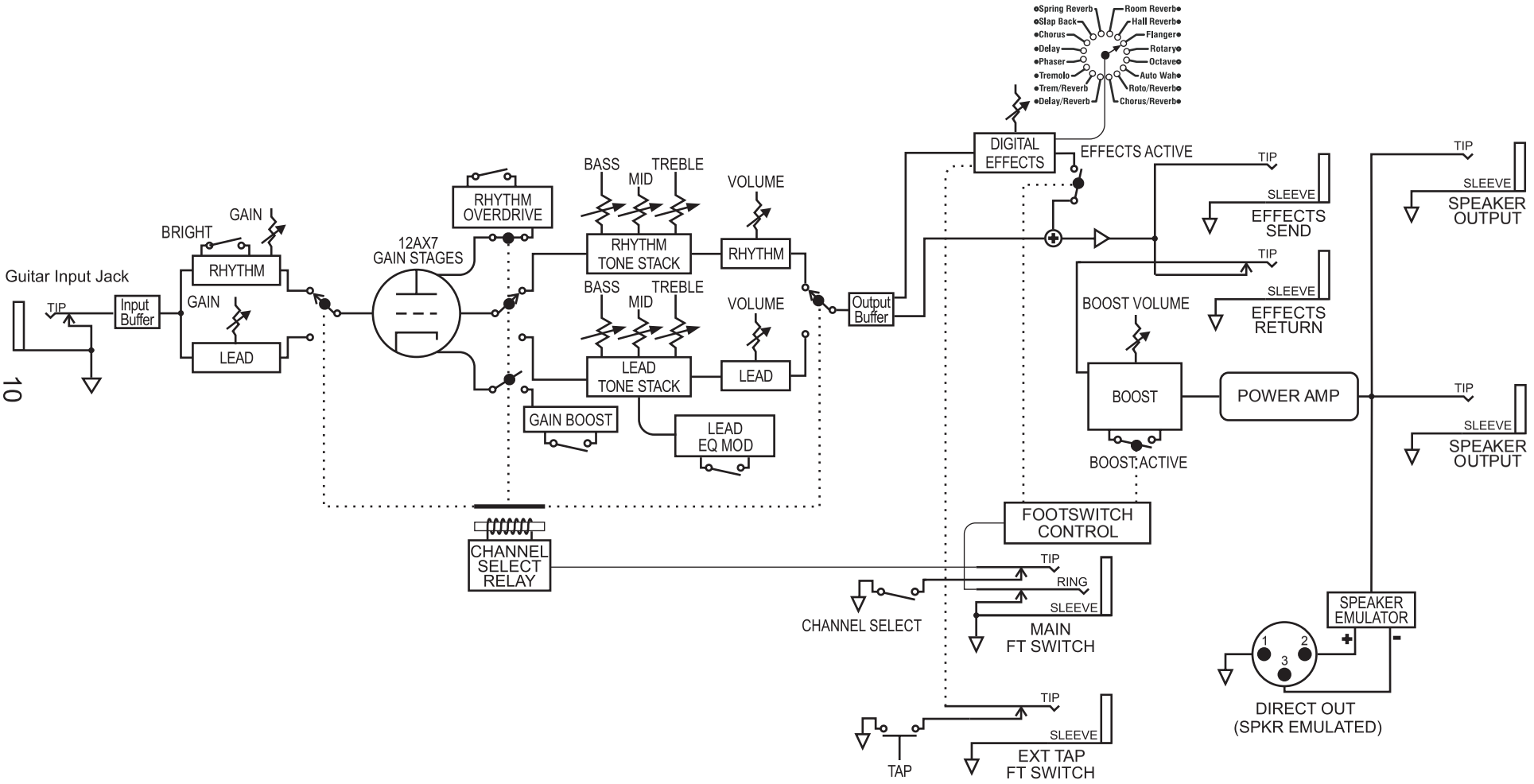


1.) AC Power Cord Receptacle - AC power cord can be removed for easy storage and replacement if damaged. Insert the AC cord (provided) firmly into the AC receptacle. **NOTE:** Replace the AC power cord if protective jacket is damaged or ground pin is damaged or removed.

2.) Fuse - The fuse is located in a fuse tray just below the receptacle. Replace only with same type and size. For your convenience, a spare fuse is located inside the fuse tray toward the front. To replace fuse, remove AC power cord. Remove fuse tray by pulling the tab located above the fuse symbol away from the receptacle.

HV™ 100THD
SPECIFICATIONS

Tubes	Preamp	1-12AX7
Output Power	100 Watts, RMS	4 Ohms @ 5% THD
Speaker Outputs	2 X 1/4"	Parallel connected, one or both can be used.
Input Impedance	Single Input	100 K Ohms
Hum & Noise	-56 dBV	Residual Noise, all level controls 0% (minimum)
System Gain All measurements taken with 1 kHz input signal, Tone controls flat, Boost volume control at 0. Unless stated otherwise, Effects turned off. Measured at speaker jack with 8 Ohm load.	45 dBV	Rhythm Channel Nominal gain, Gain & Volume @ 5
	65 dBV	Rhythm Channel Maximum gain, Gain & Volume @ 10
	65 dBV	Lead Channel Nominal gain, Gain & Volume @ 5
	85 dBV	Lead Channel Maximum gain, Gain & Volume @ 10
	10 dBV	Maximum gain of footswitchable Volume Boost.
	10 dBV	Gain increase at 1 kHz when Gain Boost is pressed.
	4 dBV	Gain increase at 1 kHz when Overdrive is pressed.
	25 ~ 35 dBV	Power amp gain (Effects Return to Speaker, depending on Boost).
Nominal Signal to Noise	60 dBV	Rhythm Channel, with Volume Half & Master Maximum, Boost on 10.
Effects Loop	0.1 VRMS (-20 dBV)	Levels w/Boost on 10 to reach full power output.
	0.33 VRMS (-10 dBV)	Levels w/Boost on 0 to reach full power output.
Footswitchable Boost	Master Volume Boost	Adjustable from 0 to +10 dB boost AFTER the Effects Loop.
XLR Direct Output		After power amp with speaker emulation.
Digital Effects	24 bit DSP module, 16 effects w/programmable tap-toggle switch.	
Footswitch	Use KACFS301 (sold separately) to select Rhythm/Lead, Boost, Effects On/Off	
	Uses a standard stereo shielded cable, but can use mono cable for emergency limited functions.	
	Use KACFS101M (sold separately) or standard momentary Footswitch with mono cable for Tap.	
Power Requirements	USA/Canada	120VAC/60Hz, 180W nominal
	Europe	230VAC/50Hz, 180W nominal
	UK	240VAC/50Hz, 180W nominal
	Australia	240VAC/50Hz, 180W nominal
	Japan	100VAC/50-60Hz, 180W nominal
Dimensions/Weight	cm^3/kg	29.2 (H) x 68.6 (W) x 24.8 (D), 13.8 kg.
	$Inches^3$/Pounds	11.5 (H) x 27.0 (W) x 9.75 (D), 30.5 lbs.



HV™ 100THD SIGNAL FLOW DIAGRAM

EC Declaration of Conformity

We:

Kustom Musical Amplification Inc.
3015 Kustom Drive
Hebron, Ky 41048-0568
Tel: 1-859-817-7100 Fax: 1-859-817-7150

Declare that the product

Product name: Kustom

Product model number: HV™100THD

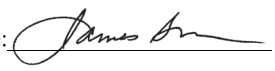
to which this declaration relates is in conformity with the following standards;

EN55013 (A12): 1995	Limits and methods of measurement of radio disturbance characteristics of broadcast receivers and associated equipment.
EN55020: 1995	Electromagnetic immunity of broadcast receivers and associated equipment.
EN61000-3-2: 1995	Limits for harmonic current emissions (equipment input current ≤ 16A per phase).
EN61000-3-3: 1995	Limitation of voltage fluctuations and flicker in low voltage supply systems for equipment with rated currents ≤ 16A.
EN55103-1: 1995	Electromagnetic Compatibility - Product family standard for Audio, Video Audio-visual and entertainment Lighting Control Apparatus.
EN60065: 1994	Safety requirements for main operated electronic and related apparatus for household and similar general use.

Following the provisions of EU Council Directive(s): 72/73 EEC and 89/336/EEC.

We the undersigned, hereby declare that the equipment specified above conforms to the aforementioned directive(s).

Name of authorized person: James Brown, Chief Engineer

Signature: 

Date: 1 April 2009

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